

§ 23.1145

(1) Separate control of each engine and each supercharger; and

(2) Simultaneous control of all engines and all superchargers.

(c) Each power, thrust, or supercharger control must give a positive and immediate responsive means of controlling its engine or supercharger.

(d) The power, thrust, or supercharger controls for each engine or supercharger must be independent of those for every other engine or supercharger.

(e) For each fluid injection (other than fuel) system and its controls not provided and approved as part of the engine, the applicant must show that the flow of the injection fluid is adequately controlled.

(f) If a power, thrust, or a fuel control (other than a mixture control) incorporates a fuel shutoff feature, the control must have a means to prevent the inadvertent movement of the control into the off position. The means must—

(1) Have a positive lock or stop at the idle position; and

(2) Require a separate and distinct operation to place the control in the shutoff position.

(g) For reciprocating single-engine airplanes, each power or thrust control must be designed so that if the control separates at the engine fuel metering device, the airplane is capable of continued safe flight and landing.

[Amdt. 23-7, 34 FR 13095, Aug. 13, 1969, as amended by Amdt. 23-17, 41 FR 55465, Dec. 20, 1976; Amdt. 23-29, 49 FR 6847, Feb. 23, 1984; Amdt. 23-43, 58 FR 18974, Apr. 9, 1993; Amdt. 23-51, 61 FR 5137, Feb. 9, 1996]

§ 23.1145 Ignition switches.

(a) Ignition switches must control and shut off each ignition circuit on each engine.

(b) There must be means to quickly shut off all ignition on multiengine airplanes by the grouping of switches or by a master ignition control.

(c) Each group of ignition switches, except ignition switches for turbine engines for which continuous ignition is not required, and each master ignition

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control must have a means to prevent its inadvertent operation.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964; 30 FR 258, Jan. 9, 1965, as amended by Amdt. 23-18, 42 FR 15042, Mar. 17, 1977; Amdt. 23-43, 58 FR 18974, Apr. 9, 1993]

§ 23.1147 Mixture controls.

(a) If there are mixture controls, each engine must have a separate control, and each mixture control must have guards or must be shaped or arranged to prevent confusion by feel with other controls.

(1) The controls must be grouped and arranged to allow—

(i) Separate control of each engine; and

(ii) Simultaneous control of all engines.

(2) The controls must require a separate and distinct operation to move the control toward lean or shut-off position.

(b) For reciprocating single-engine airplanes, each manual engine mixture control must be designed so that, if the control separates at the engine fuel metering device, the airplane is capable of continued safe flight and landing.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-7, 34 FR 13096, Aug. 13, 1969; Amdt. 23-33, 51 FR 26657, July 24, 1986; Amdt. 23-43, 58 FR 18974, Apr. 9, 1993]

§ 23.1149 Propeller speed and pitch controls.

(a) If there are propeller speed or pitch controls, they must be grouped and arranged to allow—

(1) Separate control of each propeller; and

(2) Simultaneous control of all propellers.

(b) The controls must allow ready synchronization of all propellers on multiengine airplanes.

§ 23.1153 Propeller feathering controls.

If there are propeller feathering controls installed, it must be possible to feather each propeller separately. Each control must have a means to prevent inadvertent operation.

[Doc. No. 27804, 61 FR 5138, Feb. 9, 1996]

§ 23.1155 Turbine engine reverse thrust and propeller pitch settings below the flight regime.

For turbine engine installations, each control for reverse thrust and for propeller pitch settings below the flight regime must have means to prevent its inadvertent operation. The means must have a positive lock or stop at the flight idle position and must require a separate and distinct operation by the crew to displace the control from the flight regime (forward thrust regime for turbojet powered airplanes).

[Amdt. 23-7, 34 FR 13096, Aug. 13, 1969]

§ 23.1157 Carburetor air temperature controls.

There must be a separate carburetor air temperature control for each engine.

§ 23.1163 Powerplant accessories.

(a) Each engine mounted accessory must—

(1) Be approved for mounting on the engine involved and use the provisions on the engines for mounting; or

(2) Have torque limiting means on all accessory drives in order to prevent the torque limits established for those drives from being exceeded; and

(3) In addition to paragraphs (a)(1) or (a)(2) of this section, be sealed to prevent contamination of the engine oil system and the accessory system.

(b) Electrical equipment subject to arcing or sparking must be installed to minimize the probability of contact with any flammable fluids or vapors that might be present in a free state.

(c) Each generator rated at or more than 6 kilowatts must be designed and installed to minimize the probability of a fire hazard in the event it malfunctions.

(d) If the continued rotation of any accessory remotely driven by the engine is hazardous when malfunctioning occurs, a means to prevent rotation without interfering with the continued operation of the engine must be provided.

(e) Each accessory driven by a gearbox that is not approved as part of the powerplant driving the gearbox must—

(1) Have torque limiting means to prevent the torque limits established

for the affected drive from being exceeded;

(2) Use the provisions on the gearbox for mounting; and

(3) Be sealed to prevent contamination of the gearbox oil system and the accessory system.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-14, 38 FR 31823, Nov. 19, 1973; Amdt. 23-29, 49 FR 6847, Feb. 23, 1984; Amdt. 23-34, 52 FR 1832, Jan. 15, 1987; Amdt. 23-42, 56 FR 354, Jan. 3, 1991]

§ 23.1165 Engine ignition systems.

(a) Each battery ignition system must be supplemented by a generator that is automatically available as an alternate source of electrical energy to allow continued engine operation if any battery becomes depleted.

(b) The capacity of batteries and generators must be large enough to meet the simultaneous demands of the engine ignition system and the greatest demands of any electrical system components that draw from the same source.

(c) The design of the engine ignition system must account for—

(1) The condition of an inoperative generator;

(2) The condition of a completely depleted battery with the generator running at its normal operating speed; and

(3) The condition of a completely depleted battery with the generator operating at idling speed, if there is only one battery.

(d) There must be means to warn appropriate crewmembers if malfunctioning of any part of the electrical system is causing the continuous discharge of any battery used for engine ignition.

(e) Each turbine engine ignition system must be independent of any electrical circuit that is not used for assisting, controlling, or analyzing the operation of that system.

(f) In addition, for commuter category airplanes, each turbopropeller ignition system must be an essential electrical load.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-17, 41 FR 55465 Dec. 20, 1976; Amdt. 23-34, 52 FR 1833, Jan. 15, 1987]